

V. REMARKS

Claims 1-5 and 16 are rejected under 35 U.S.C. 103(a) as unpatentable over Brandolf (U.S. Patent No: 4,511,593) in view of Nobutani et al. (U.S. Patent No. 4,964,962). The rejection is respectfully traversed.

Brandolf teaches a vapor deposition apparatus that includes an evacuation chamber, a supply device, a converting device, a substrate support and a deflection shield. The evacuation chamber defines a deposition chamber suitable for evacuation of the chamber. The supply device is disposed in the chamber for supplying a source of coating material. The converting device is operative upon the source of coating material for converting the source material into a plasma of particles emanating outwardly from the source. The substrate support supports a substrate of the type having at least one surface area suitable for receiving and for being coated by the plasma of coating material. The deflection shield is operatively disposed in the chamber between the source and the substrate supporting means for blocking movement of a majority of those the plasma particles traveling in a line-of-sight direction from the source to the supported substrate. The blocked plasma particles strike and impart kinetic energy to the shield means, thereby heating the shield means. The substrate surface is primarily coated by the plasma particles that diffuse around the shield means. The deflection shield means and the substrate support are spaced and arranged relative to one another such that the heat from the shield means radiates to and operatively heats the supported substrate.

Nobutani teaches a method for forming a conducting metal layer on an inorganic substrate. The inorganic substrate is accommodated within a vacuum vessel of a sputtering device, is heated within the vacuum vessel the inorganic substrate to a predetermined temperature while attaining a vacuum inside the vacuum vessel. A rare gas is introduced into the vacuum vessel as a discharge gas. A high frequency power is applied to the heated inorganic substrate with the heated inorganic substrate made as a target within the vacuum vessel for carrying out an ion bombardment for a predetermined time. The high frequency power application is interrupted and the rare gas is regulated. Sputtering is

carried out by applying a DC power to a conducting metal member disposed in the vessel as a target so as form a conducting metal film on the inorganic substrate.

Claim 1 is directed to a plasma cleaning device that includes a chamber, a process gas introducing mechanism, an active electrode, a grounded reflecting electrode, a grounded earth electrode and a plasma generating power supply. Claim 1 recites that the chamber cleans a process target disposed therein with a plasma and the chamber has an exhaust mechanism evacuating the chamber to a reduced pressure therein lower than the atmospheric pressure. Claim 1 also recites that the process gas introducing mechanism introduces a process gas into the chamber and the active electrode, the grounded reflecting electrode and the grounded earth electrode are housed in the chamber with the active electrode disposed between the earth electrode and the reflecting electrode. Claim 1 further recites that the plasma generating power supply is connected to the active electrode for supplying a power supply for use in generating the plasma in the chamber. Additionally, claim 1 recites a disposing position of the process target for disposing the process target with the earth electrode being disposed between the process target and the active electrode and an electrically conductive path connects to the process target.

In rejecting claims under 35 U.S.C. §103, the United States Patent and Trademark Office bears the initial burden of presenting a *prima facie* case of obviousness. Only if that burden is met, does the burden of coming forward with evidence or argument shift to the applicant. "A *prima facie* case of obviousness is established if the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." In re Bell, 991 F.2d 781, 782, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993) quoting In re Rinehart, 531 F.2d 1048, 1051, 189 U.S.P.Q. 143, 147 (CCPA 1776). The mere fact that the prior art *may* be modified in the manner suggested by the Examiner neither makes the modification *prima facie* obvious or obvious unless the prior art suggested the desirability of the modification. The test for obviousness is what the combined teachings of the references would have

suggested to one of ordinary skill in the art. The conclusion that the claimed subject matter is obvious must be supported by evidence, as shown by some objective teaching in the prior art or by knowledge generally available to one of ordinary skill in the art that would have led the individual to combine the relevant teachings of the references to arrive at the claimed invention. If the Examiner fails to establish a *prima facie* case of obviousness, the rejection is improper and will be overturned.

It is respectfully submitted that there must be a basis in the art for combining or modifying references. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Both Brandolf and Nobutani are sputtering devices, i.e. devices that form a metal film on a substrate. The claimed invention is a plasma cleaning device that cleans a target with plasma but does not form a metal film on the target. It is respectfully submitted that none of the applied art, alone or in combination, teaches or suggests the features of claim 1 as recited above. It is respectfully submitted that where no reasonable intrinsic or extrinsic justification exists for the proposed combination, *prima facie* obviousness will not have been established. Thus, it is respectfully submitted that one of ordinary skill in the art would not be motivated to combine the features of the applied art because such combination would not result in the claimed invention.

Further, it is respectfully submitted that Brandolf and Nobutani are non analogous art. As mentioned above, both Brandolf and Nobutani are sputtering devices, i.e. devices that form a metal film on a substrate while the claimed invention is a plasma cleaning device that cleans a target with plasma.

Furthermore, it is respectfully submitted that that the Examiner fails to consider all of the claimed features of the invention, especially those that are missing from the prior art. Claim 1 recites that the chamber cleans a process target disposed therein with a plasma. It is respectfully submitted that none of

the applied art, alone or in combination, teaches or suggests this particular feature of claim 1.

When evaluating a claim for determining obviousness, all limitations of the claim must be considered. Under 35 U. S. C. 103, it provides that:

a patent may not be obtained if the differences between the subject matter sought to be patented and the prior art are such that *the subject matter as a whole* would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains.

It is respectfully submitted that the applied art fails to teach or suggest a chamber that cleans a process target disposed therein with a plasma as recited in claim 1.

Additionally, it is respectfully submitted that the United States Patent and Trademark Office destroys the intended function of the prior art inventions to arrive at the claimed invention. The Federal Circuit Court of Appeals has consistently held that when a §103 rejection is based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in the reference, such a proposed modification is not proper and a prima facie case of obviousness cannot be properly made. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). As mentioned above, both Brandolf and Nobutani are sputtering devices, i.e. devices that form a metal film on a substrate while the claimed invention is a plasma cleaning device that cleans a target with plasma.

In the Description of the Background Art of the specification on page 1, lines 20-23, it states:

The plasma cleaning device has been expected as a replacement of cleaning using a cleaning liquid such as a freon substitute (JP A 2002-141324, JP A 2002-153832, JP 2002-126675, JP A 2002-126674 and others.

It is respectfully submitted that none of the applied art, alone or in combination, can be used as a replacement of cleaning using a cleaning liquid such as a freon substitute.

Also, the United States Patent and Trademark Office fails to establish motivation as to why one of ordinary skill in the art would combine the cited prior art references. The motivation presented by the United States Patent and Trademark Office is derived from the claimed invention, not the applied art. Based upon the benefits of the claimed invention, the United States Patent and Trademark Office improperly establishes motivation because it is found in the claimed invention and not in the applied art. The United States Patent and Trademark Office must show motivation to combine the applied art in view of the applied art themselves, not by showing the benefits of the claimed invention itself.

MPEP 2143.01 states that the prior art must suggest the desirability of the claimed invention. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

It is respectfully submitted that the Examiner fails to identify a persuasive suggestion to combine the teachings of the references. "Identification in the prior art of each individual part claimed is insufficient to defeat patentability to the whole claimed invention." In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000) (citing In re Rouffet, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998)). "Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant." Id., 55 USPQ2d at 1316 (citing In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998) and In re Gordon, 733 F.2d 900, 902, 221 USQP 1125, 1127 (Fed. Cir. 1984)). "Evidence of a suggestion, teaching, or motivation to combine may flow from the

prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved....” In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (citing Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996) and Para-Ordinance Mfg. v. SGS Imports Intern., Inc., 73 F.3d 1085, 1088, 37 USPQ2d 1237, 1240 (Fed. Cir. 1995)). “The range of sources available, however, does not diminish the requirement for actual evidence. That is, the showing must be clear and particular. See, e.g., C.R. Bard, 157 F.3d at 1352, 48 USPQ2d at 1232. Broad conclusory statements regarding the teaching of multiple references, standing alone, are not ‘evidence.’” Id., 50 USPQ2d 1576 at 1617 (citing McElmurry v. Arkansas Power & Light Co., 995 f.2d 1576, 1578, 27 USPQ2d 1129, 1131 (Fed. Cir. 1993) and In re Sichert, 566 F.2d 1154, 1164, 196 USPQ 209, 217 (CCPA 1977).

Thus, the United States Patent and Trademark Office fails to properly establish any motivation for one of ordinary skill in the art to combine the features of the applied art to arrive at the claimed invention. To the contrary, the motivation asserted by the United States Patent and Trademark Office is actually found in the claimed invention.

The conclusion that the claimed subject matter is obvious must be supported by evidence, as shown by some objective teaching in the prior art or by knowledge generally available to one of ordinary skill in the art that would have led the individual to combine the relevant teachings of the reference to arrive at the claimed invention. See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). The Examiner may not, because of doubt that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis for the rejection. See In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 177 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

In this instance, the United States Patent and Trademark Office relies on hindsight reconstruction to supply the deficiencies of the applied art. Specifically,

the Examiner mischaracterizes the shield member 60 in Brandolf as a plate electrode. In column 8, lines 58-63 of Brandolf, it states:

A shield member 60 is interposed within the plasma stream 50 between the source 40 and the substrates 30, so as to intercept particles of the plasma 50 traveling in line-of-sight paths from the source 40 toward the substrates 30, and in a manner so as to cast a "shadow" in the plasma stream 50 over the substrates 30. In other words, the shadow (illustrated at 60' in FIG. 1), is defined by that volumetric region within the plasma stream 50 that is shielded by the shield member 60 from the plasma stream 50 so as not to contain any significant number of such plasma particles traveling in a line-of-sight direction from the source 40.

Asserting that the shield member 60 is allegedly a plate electrode is impermissible hindsight reconstruction.

Also, on Page 2 of the Office Action, the United States Patent and Trademark Office asserts that the apparatus taught by Brandolf would be capable of cleaning up the process target. For similar reasons discussed above, asserting that a sputtering device can clean a process target (as the claimed invention) is impermissible hindsight reconstruction.

Further, on Page 2 of the Office Action, the United States Patent and Trademark Office notes that the recitation of intended use of the claimed apparatus for cleaning has been considered but does not have patentable weight. It is believed that the Examiner asserts that claim 1 is a "use claim". It is respectfully submitted that the functional language recited in claim 1 provides life and meaning to the structural features of the invention, a plasma cleaning device. If the United States Patent and Trademark Office believes that claim 1 is a "use claim", claim 1 should be rejected under alternative grounds based upon 35 USC 101 and 112 as provided in MPEP 2173.05(q).

For at least the reasons discussed above, it is respectfully submitted that claim 1 is allowable over the applied art.

Claims 2-5 and 16 depend from claim 1 and include all of the features of claim 1. Thus, it is respectfully submitted that the dependent claims are

allowable at least for the reason claim 1 is allowable as well as for the features they recite.

Withdrawal of the rejection is respectfully requested.

Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as unpatentable over Brandolf in view of Nobutani and further in view of Li et al. (U.S. Patent No: 6,178,919). The rejection is respectfully traversed.

Li teaches a plasma processing reactor for processing a substrate that includes a chamber, a top electrode, a bottom electrode, an insulating shroud and a perforated plasma confinement ring. The top electrode is configured to be coupled to a first RF power source having a first RF frequency. The bottom electrode is configured to be coupled to a second RF power source having a second RF frequency that is lower than the first RF frequency. The insulating shroud lines an interior of the chamber and is configured to be electrically floating during the processing. The perforated plasma confinement ring surrounds and is disposed outside of an outer periphery of the bottom electrode. Also, the perforated plasma confinement ring is disposed in its entirety at or below a top surface of the substrate. Further, the perforated plasma confinement ring is formed from an electrically conductive material and is electrically grounded during the processing so as to increase ion energy during the processing by removing electrons from the plasma.

Claims 6 and 13 depend from claim 1 and include all of the features of claim 1. Thus, it is respectfully submitted that the dependent claims are allowable at least for the reason claim 1 is allowable as well as for the features they recite.

Withdrawal of the rejection is respectfully requested.

Claims 7-9 are rejected under 35 U.S.C. 103(a) as unpatentable over Brandolf in view of Nobutani as applied to claim 3 and further in view of Godyak (U.S. Patent No: 4,792,727). The rejection is respectfully traversed.

Godyak reveals a system for controlling a gas discharge lamp to provide a positive voltage-current characteristic to permit stable lamp operation without a ballast. The system includes a device coupled to the lamp and defining a first

source of power to provide electron heating without in itself providing ionization of the lamp gas and a device also coupled to the lamp and defining a second pulsed source of power having an average output power substantially less than the first source output power to provide ionization of the lamp gas and having a duty cycle substantially less than unity.

Claims 7-9 depend from claim 1 and include all of the features of claim 1. Thus, it is respectfully submitted that the dependent claims are allowable at least for the reason claim 1 is allowable as well as for the features they recite.

Withdrawal of the rejection is respectfully requested.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as unpatentable over Brandolf in view of Nobutani as applied to claim 3 and further in view of Ito et al. (Japanese Unexamined Patent Publication 62-267483). The rejection is respectfully traversed.

JP 483 discloses a plasma treating chamber in which a processing gas is introduced. Electric power is applied on an upper electrode by a high-frequency power source and is conducted to a grounded substrate electrode and a capacitor to generate plasma between the electrodes. The ions formed in the plasma are injected onto the substrate that is placed on the substrate electrode through an insulator sheet to carry out etching.

Claims 10-12 depend from claim 1 and include all of the features of claim 1. Thus, it is respectfully submitted that the dependent claims are allowable at least for the reason claim 1 is allowable as well as for the features they recite.

Withdrawal of the rejection is respectfully requested.

Claim 14 is rejected under 35 U.S.C. 103(a) as unpatentable over Brandolf in view of Nobutani as applied to claims 1 and 2 and further in view of Kidd in view of Reavill (U.S. Patent No: 4,282,077). The rejection is respectfully traversed.

Reavill discloses a uniform plasma etching system that includes a chamber, a source of reactive gas for supplying to the chamber, an RF generator coupled to the chamber for generating a plasma therein and a plurality of part cells. The plurality of part cells is disposed within the chamber and formed by

pairs of generally opposed electrodes of the same polarity. Plasma cells are located at each side of the part cells with each of the part cells being separated from each adjacent part cell by a plasma cell. Each of the plasma cells is defined by adjacent generally opposed electrodes of opposite polarity positioned to generate plasma externally of the adjacent part cell.

Claim 14 depends from claim 1 and includes all of the features of claim 1. Thus, it is respectfully submitted that claim 14 is allowable at least for the reason claim 1 is allowable as well as for the features it recites.

Withdrawal of the rejection is respectfully requested.

Claim 15 is rejected under 35 U.S.C. 103(a) as unpatentable over Brandolf in view of Nobutani further in view of Kidd in view of Reavill as applied to claim 14 and further in view of Japanese Patent 2574852. The rejection is respectfully traversed.

JP 852 discloses a discharge washer that includes a vacuum vessel, a vacuum evacuator, a plasma gas introducing unit, discharge electrodes placed in the vacuum vessel, a single power source that applies voltage upon the discharge electrodes oriented in parallel and variable resistors with each resistor provided in a circuit between the power source in each of the electrodes.

Claims 14 and 15 depend from claim 1 and include all of the features of claim 1. Thus, it is respectfully submitted that the dependent claims are allowable at least for the reason claim 1 is allowable as well as for the features they recite.

Withdrawal of the rejection is respectfully requested.

Claim 17 is rejected under 35 U.S.C. 103(a) as unpatentable over Brandolf in view of Nobutani as applied to claims 1 and 2 and further in view of Arai et al. (U.S. Patent No: 5,203,958). The rejection is respectfully traversed.

Arai teaches a processing apparatus that includes a first electrode, a second electrode, a plasma generating device, an introducing device, a pressure measuring device and a controller. The first electrode constitutes a susceptor for holding an object to be processed thereon. The second electrode is arranged to oppose the first electrode. The plasma generating device generates a plasma

between the first and second electrodes and processing the object to be processed by the plasma. The introducing device automatically introduces a heat transfer medium gas into a gap between the object to be processed and the first electrode. The pressure measuring device measures a pressure of the heat transfer medium gas in the gap. The controller automatically controls further introduction of the heat transfer medium gas into the gap depending on the measured pressure of the heat transfer medium gas so that the pressure of the heat transfer medium gas reaches a predetermined value. An inorganic insulating film is formed on the first electrode and an elastic insulating film is formed on the inorganic insulating film.

Claim 17 depends from claim 1 and includes all of the features of claim 1. Thus, it is respectfully submitted that the dependent claim is allowable at least for the reason claim 1 is allowable as well as for the features it recites.

Withdrawal of the rejection is respectfully requested.

Claim 18 is rejected under 35 U.S.C. 103(a) as unpatentable over Brandolf in view of Nobutani as applied to claims 1 and 2 and further in view of Obinata (U.S. Patent No: 4,624,767). The rejection is respectfully traversed.

Obinata teaches a sputter etching apparatus that includes an evacuable vacuum treatment chamber, a sputter etching electrode mounted in the chamber for supporting a substrate to be etched, a device for evacuating the chamber, a device for introducing an etching gas into the evacuated chamber, a device for supplying electric power to the electrode for generating a plasma from the etching gas in the chamber, an opposite electrode and a magnet device. The opposite electrode is mounted in the chamber in an electrically floating condition facing the sputter etching electrode for confining the plasma in the space formed between the opposite electrode and the sputter etching electrode. Also, the opposite electrode is electrically insulated from contact with the chamber and from direct connection with the device for supplying electric power. The magnet device is mounted in the chamber for generating a magnetic field which extends substantially perpendicularly to the opposite electrode and the sputter etching

electrode and extends in an axial direction along a peripheral open region surrounding the space so that the plasma is confined in the space.

Claim 18 depends from claim 1 and includes all of the features of claim 1. Thus, it is respectfully submitted that the dependent claim is allowable at least for the reason claim 1 is allowable as well as for the features it recites.

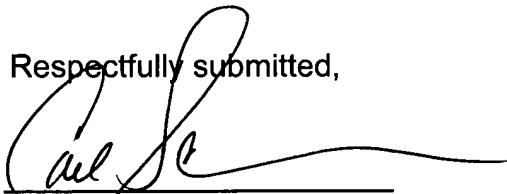
Withdrawal of the rejection is respectfully requested.

In view of the foregoing, reconsideration of the application and allowance of the pending claims are respectfully requested. Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' representative at the telephone number listed below.

Should additional fees be necessary in connection with the filing of this paper or if a Petition for Extension of Time is required for timely acceptance of the same, the Commissioner is hereby authorized to charge Deposit Account No. 18-0013 for any such fees and Applicant(s) hereby petition for such extension of time.

Respectfully submitted,

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